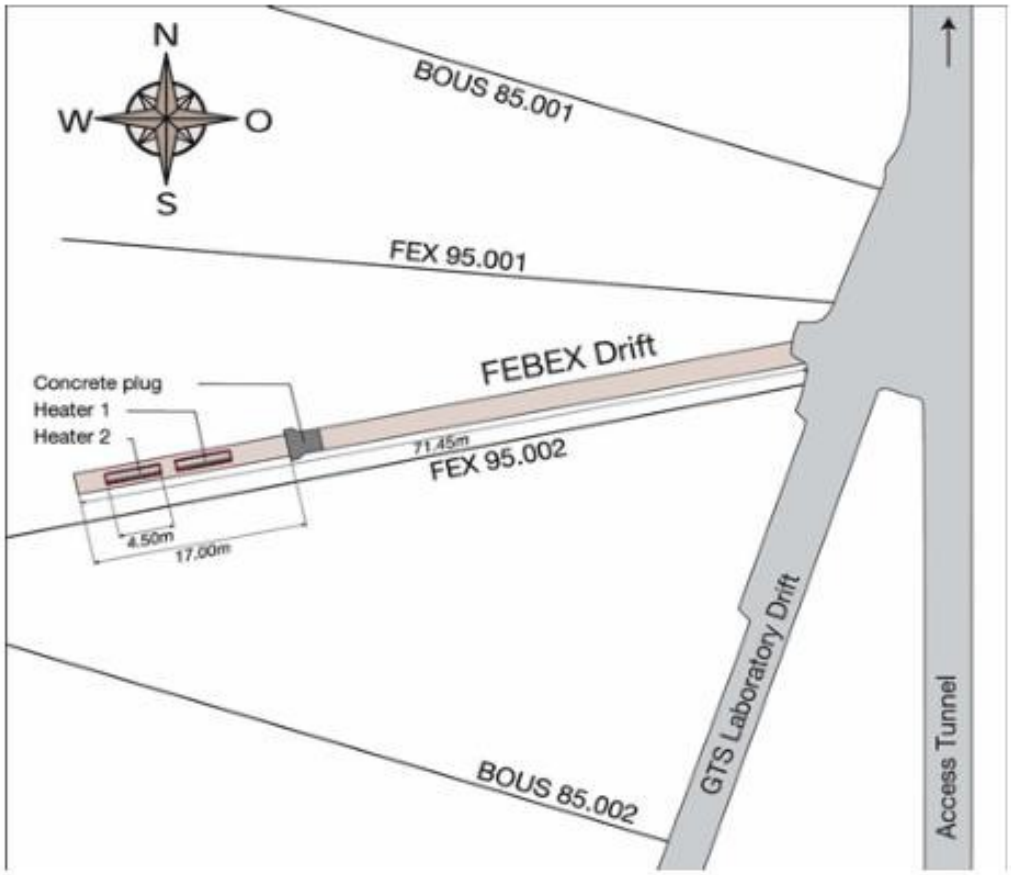
Large-scale Experiments in Underground Research Laboratories

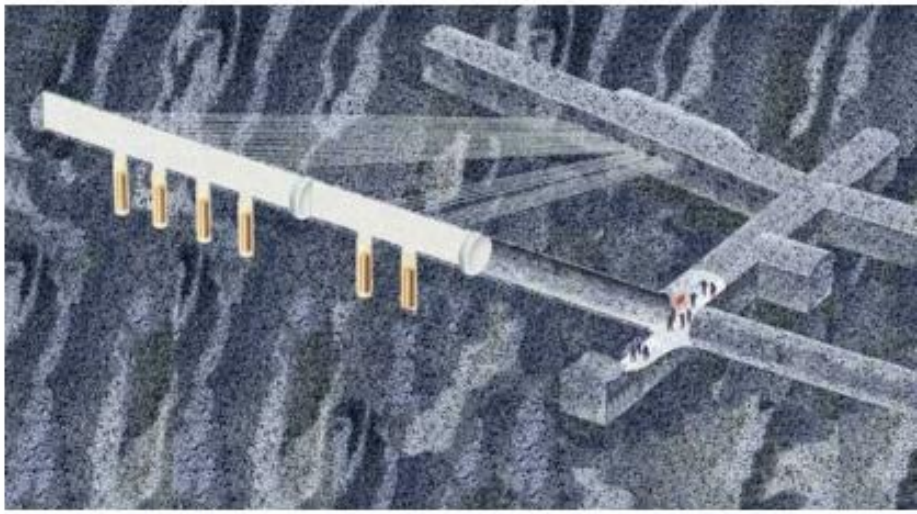
Experience in EBS Engineering Development and Handling Feasibility

Christer Svemar, Fernando Huertas and Roland Pusch

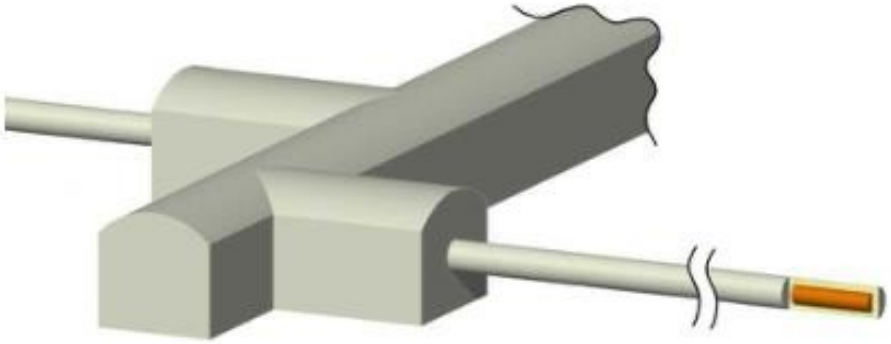
FEBEX The two projects

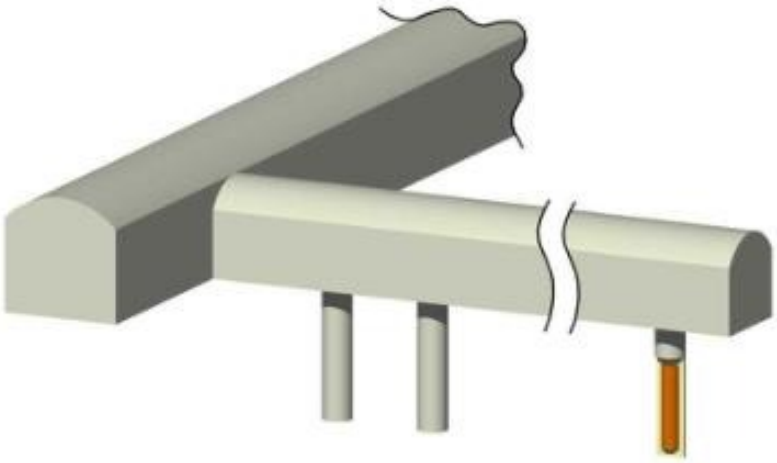


Prototype Repository

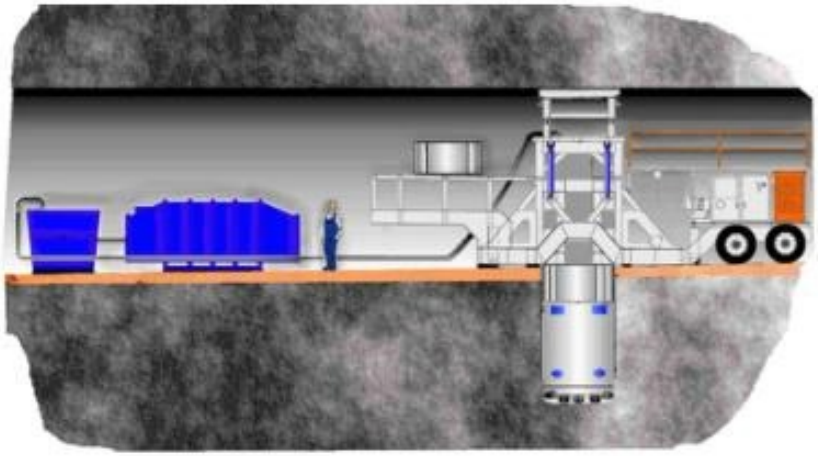


Horizontal vs vertical emplacement modes





Excavation of drifts and holes



Prototype Repository

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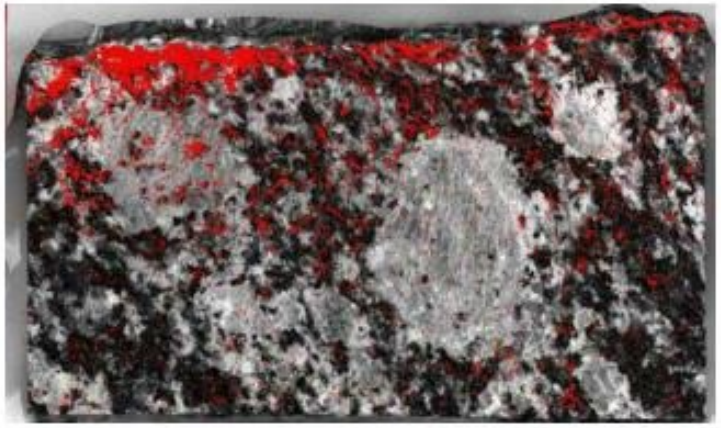
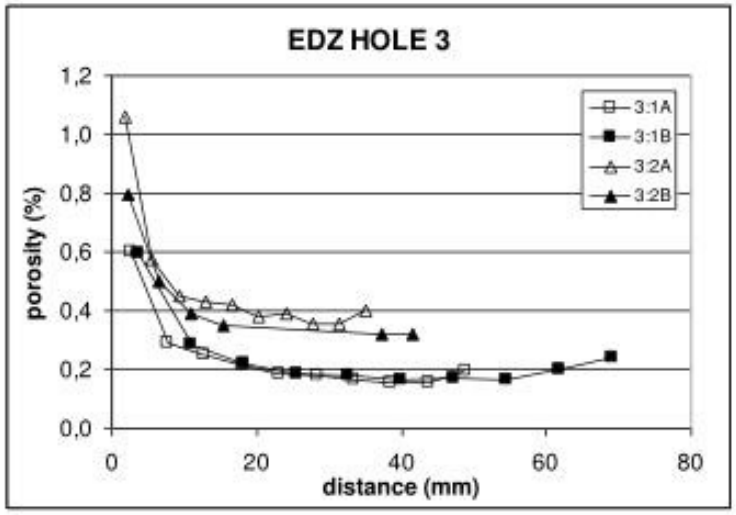
Excavation Damaged Zone (EDZ)

Prototype Repository





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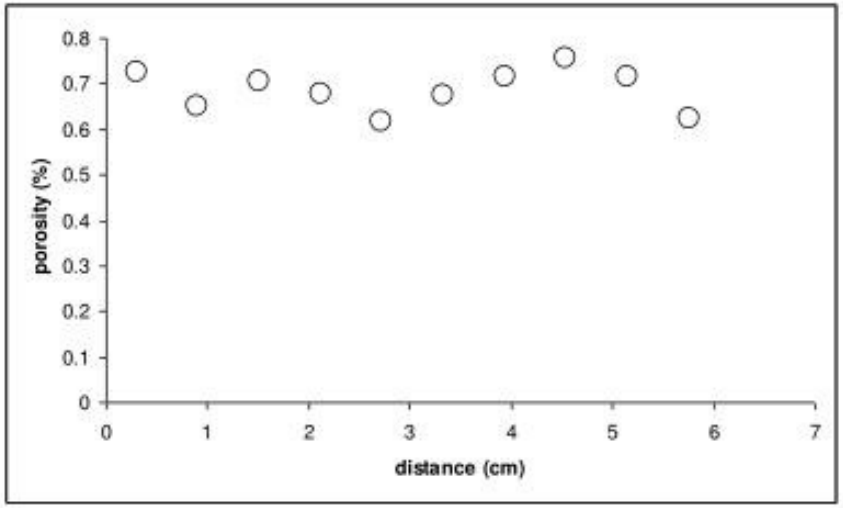

Emplacement of bentonite blocks (liner) and pellets

Prototype Repository

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Canister emplacement

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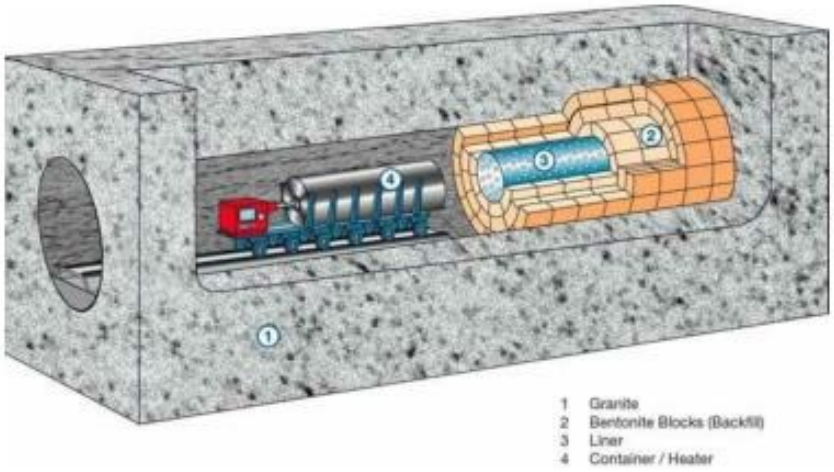
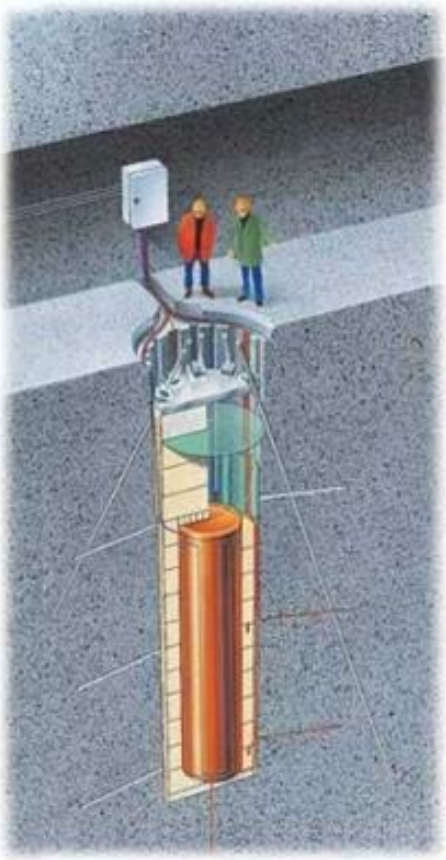


Prototype Repository

Retrieval

Horizontal emplacement mode

Vertical emplacement mode



Results and conclusions 1(2)

- TBM excavation of drifts is a proven technology
- Vertical boring of deposition holes has been shown possible to do with a higher accuracy than assumed
- Bentonite blocks can be pre-compacted to the size needed
- Installation of brick-size bentonite blocks and liner in the horizontal mode can be done in the assumed way, but the humidity in a drift puts time constraint on the installation
- Vertical installation of large blocks can meet accuracy requirements, but humidity in the air and, even more, dripping water demands protection of the bentonite blocks
- Both horizontal and vertical emplacement of canisters meet the high requirement on alignment
- In situ compaction of backfill can meet quality requirements with 30/70 mixtures of bentonite and crushed rock
- Retrieval of emplaced canisters is technically feasible

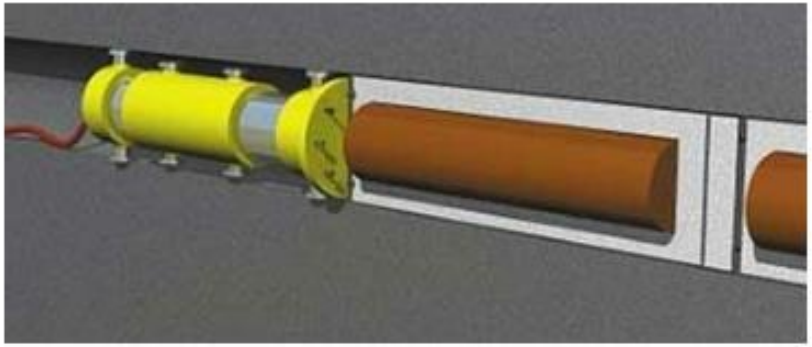
Results and conclusions 2 (2)

- Main technical difficulty in horizontal emplacement was the alignment of the canister, and
- the water inflow in the vertical emplacement mode, both into holes and into the drift

- In both projects were practical manufacturing and emplacement methods simulated with good result, including measures taken to overcome the difficulties mentioned above
- Further development can be directed toward optimisation of concepts

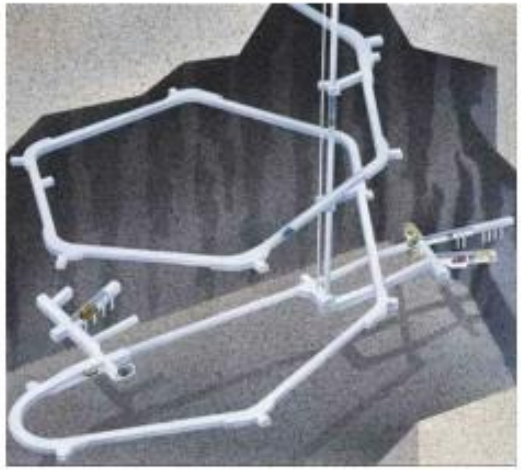
The future

Testing of horizontal emplacement techniques at Aspo HRL



Objectives

- To continue the technical development of practically applicable techniques
- To provide the basis for PA of the KBS-3H concept
- To demonstrate technical feasibility in field test in ÄHRL



Thank you for your attention